

THE ZOOLOGIST

No. 880.—October 15th, 1914.

ZOOLOGICAL NOTES ON A COLLECTING EXPEDITION IN BORNEO.

By J. C. MOULTON, F.Z.S., Curator of the Sarawak Museum.

THE naturalist who wishes to inflict his tale on a patient reader ought to have one at least of these three excuses:—(i) a real gift for observing and recording the wonders of Nature; (ii) a comparatively unknown or distant country to write about; or (iii) a region of some historic interest.

I claim these last two as my excuses for this paper:—(i) on the grounds that Borneo is a month's journey from Piccadilly, and (ii) that the journey I describe is almost identical with that undertaken by the great naturalist, A. R. Wallace, nearly sixty years ago.

Wallace's 'Malay Archipelago,' justly regarded as a classic among English books of travel, describes many an interesting excursion into the hidden recesses of these wonderful Malayan islands. Some fifty or sixty years have now elapsed since Wallace travelled in the Malay islands, and the dread march of civilization has wrought sweeping changes in some of them, although others still remain much as then. I have already described two places * made famous by the great naturalist in the 'Malay Archipelago,' and now offer to readers of the 'Zoologist' a brief account of a journey in the interior of Sarawak, over

* "Where Wallace Trod," being some account of an entomological trip to Mt. Serambu, Sarawak, Borneo, 'Entomologist,' 1912, pp. 213 and 246. "A Brief Visit to Malacca," 'Entomologist,' 1913, p. 278.

almost exactly the identical route followed by Wallace nearly sixty years ago.

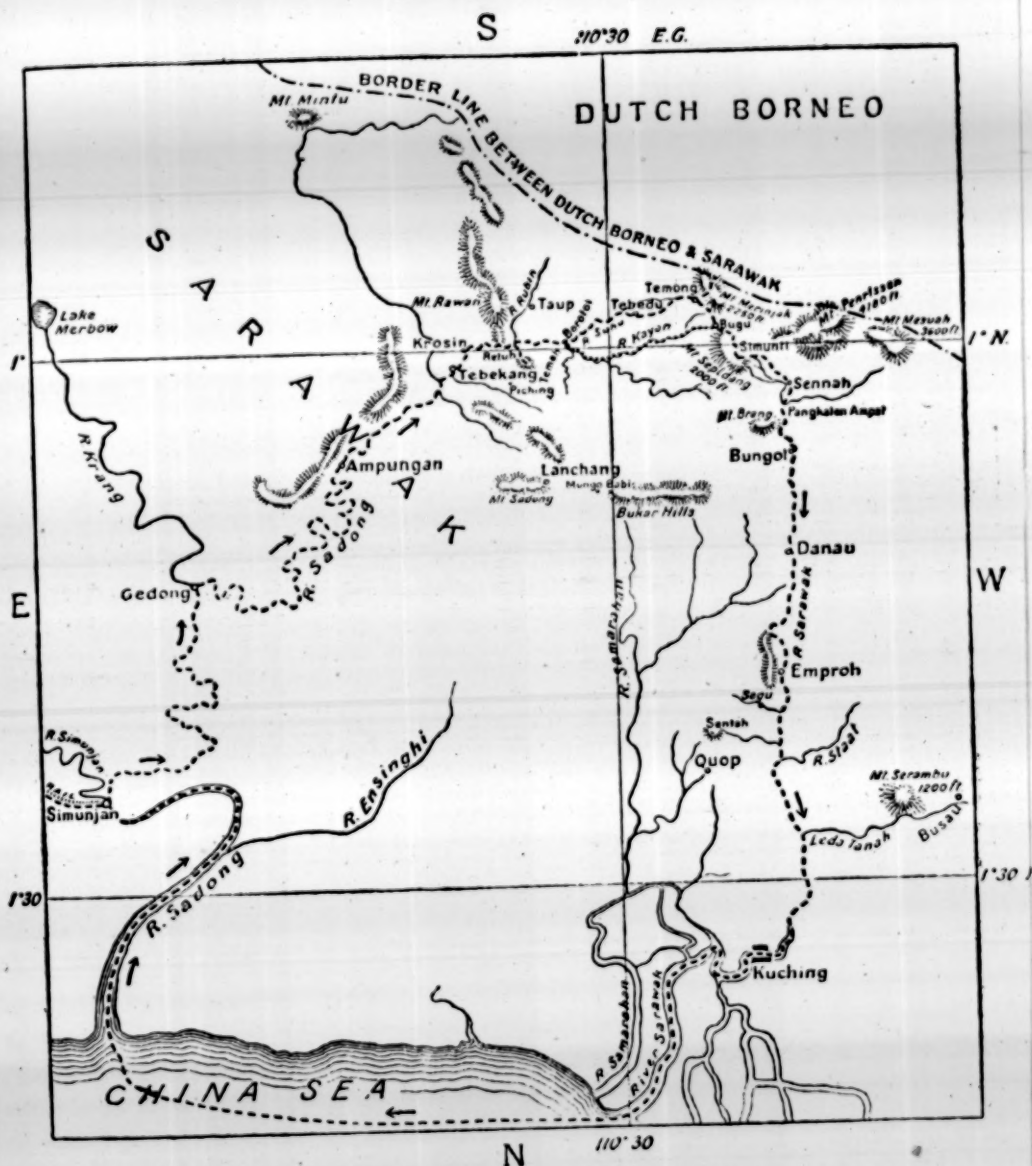
Perhaps I should remind the reader of Wallace's stay in Borneo; this lasted from November 1st, 1854, to January 25th, 1856. His travels were confined to the western portion of Sarawak, the first four months being occupied with excursions from Kuching, the capital, to various places on the Sarawak river. His essay "On the Law which has Regulated the Introduction of New Species" (which preceded the historic essay of 1858, from Ternate) was written at Santubong in February, 1855. In March, 1855,* he went to Sadong, where a coal mine was being opened up. This is situated near the river of that name, which lies some twenty miles east of the Sarawak river. Here he remained nine months, returning to Kuching at the end of the year 1855 by a route through the interior, which took him to the source of the Sadong river, through the country of the Land- or Hill-Dayaks, and thence across the watershed to the source of the Sarawak river; down this to Kuching is a bare two days' journey. The whole excursion, fully described in Chapter V. of the 'Malay Archipelago' (pp. 101-116, 1st ed.), occupied some nine days (November 27th, 1855, to about December 5). The journey described in the present paper covered nearly the same route, and took place in May, 1914.

On Wallace's return to Kuching he made one more expedition up-river, this time to Mt. Serambu, where he spent some four weeks in all before returning to Singapore in January, 1856.

The accompanying sketch-map shows the places visited by Wallace, and the circular tour made by us in 1914.

The small Government launch steamed down the river, leaving Kuching, the capital, punctually at 8 a.m. on May 8th with our party all on board—six Dayak collectors, a Malay collector, Chinese cook, and two Europeans (B. in search of Coleoptera and the writer). An hour-and-a-half to the mouth of the river, three hours across a glassy sea to the east, and then up the Sadong river for two hours brought us to Simunjan, a Government station, where C., the Resident in charge, received us for the night.

* In the first edition of the 'Malay Archipelago' the date appears as 1865.



Author's route 1913 -----
 Wallace's route 1855 the same
 from Simunjan to Borotoi and
 from Bugu to Kuching
 Wallace's route from Borotoi
 to Bugu

A small railway runs out three miles from the right bank to a neighbouring hill, where coal has been worked since Wallace's day. We walked out in the evening and met the manager. He had kindly made enquiries for me of the oldest inhabitants, but none remembered Wallace. It was interesting, however, to hear that someone had heard a *mias* (Orang Utan, *Simia satyrus*) that very morning near by. The writer had the privilege of meeting the great naturalist at Broadstone just a year before his death; one of the first things he asked was about the numbers of the *mias* to be seen at Sadong now. Dr. Wallace told me he used to meet with three or four, or more, every day. Nowadays they are very much scarcer, though a strict Government Order is now in force to prevent their extermination. It occasionally happens that one of these huge apes starts ravaging the natives' fruit trees, and then the Government does not prohibit retaliation; but on no account may the Orang Utan be hunted in his natural haunts. A more recent Order extends a wide protection over the fauna and flora of Sarawak in general, so that the naturalist-dealer and would-be exporter of thousands finds he has come to the wrong country. As a result of this protection one can follow up the Simunjan river and find in the upper reaches troupes of the curious Long-nosed Monkey (*Nasalis larvatus*) (which, by the way, is only found in Borneo) disporting themselves unconcernedly on the banks, and little disturbed by the passing of a boat within a few yards of them.

Next day we waited for the incoming tide before starting up-river in boats. At this time of the month a fairly large bore comes rushing up the river, swamping any unwary boats. The neighbouring river, called the Batang Lupar, also has a dangerous bore, but others in Sarawak are free from this curious wave.

The Resident, the Native Officer (a Malay Hadji), and a policeman helped to swell our numbers, their objective being the Land-Dayak country in the Upper Sadong, to collect the annual tax.

Paddling for some six hours brought us to the small Malay village of Gedong, where we stayed the night. About the only frequent sign of life was the big Nymphaline butterfly *Parthenos*

sylvia, which appeared to be abundant most of the way up the river.

May 10th.—Started early in the morning, the next tide again helping us on up the river for some four hours to the Malay village of Tanah Putih. From this point our progress was considerably slower, paddling against the stream for another five hours, and eventually arriving at Ampungan, where we passed the night in a comfortable Malay house. Another day's paddling brought us to the large village of Tabekang, which is picturesquely spread along both banks amid close plantations of cocoanut and pinang palms. The Land-Dayak village and some half-dozen Chinese shops occupy the left bank, while the Malay houses are built on the right; a spacious Government rest-house stands on a high bank at a bend above the village.

The river journey thus far offers little of zoological interest. A Bronze-winged Dove (*Chalcophaps indica*) was shot crossing the river; the common Atlas Moth (*Attacus atlas*) was seen with wings outspread on a shrub by the water's edge, but the combination of a collapsible net and a Malay boatman saved its life.

Our course had been in a general southerly direction. From this point a belt of country, extending to the border of Dutch Borneo some ten miles further south, stretches west to the head of the Sarawak river; this is thickly populated with Land-Dayaks—an interesting race who have kept much to themselves, living a quiet, sedentary life. Up till some seventy-five years ago they formed the natural prey of grasping Malay rulers and wandering Sea-Dayak head-hunters. One of the principal objects of Sir James Brooke, the first Rajah of Sarawak, was the protection of these Land-Dayaks. He was made Rajah in 1842, and from that time on peace reigned in this portion of Sarawak, though other parts further to the north-east took many years to pacify. From an ethnologist's point of view, the Land-Dayaks are of much interest. Alone of all the Sarawak tribes they preserve customs which indicate a former Hindu influence, and this, no doubt, is due to their Javanese origin. Even to-day the up-river chiefs preserve traditions of their journey from Java to South Borneo, and thence through the island to their present position. Talking about this one day, a Land-Dayak told me that a Javanese stayed in his village and

expressed his surprise at finding the customs and language of his hosts so like his own. The Sea-Dayak are, of course, a very different race, more nearly akin to the Malays. They are of a more restless, go-ahead disposition, and in the early days of the Brooke rule gave much trouble.

We had hoped to stay some days at Tabekang collecting natural history specimens while C. collected the tax, but a view from a neighbouring hill soon showed us that it would be mere waste of time. With the exception of one or two steep limestone crags supporting a thin scrub, the whole country had been cleared by the Dayaks for their paddy farms. Portions which were not then in use had reverted to jungle, but so far only a useless secondary growth had appeared.

It takes years for this to give way to big "primeval" jungle again, although in course of time it becomes impossible to tell whether such land had ever been cleared or not. On the west coast of British North Borneo there are big stretches of coarse grassland, where the soil seems too poor to support any luxuriant vegetation. I doubt whether it ever has, although I have been told that it is land that has never recovered from native clearing.

In the palm groves we found the common Fulgorid *Aphana farinosa*; its colouring was certainly procryptic, as it continually chose the light trunk of a coconut or nibong palm for its usual resting-place. One could catch them in the hand on such places, though they often jumped clear in time.

Among other insects taken at Tabekang were the bright little Cassidæ, *Aspidomorpha fuscopunctata*, *Metrioria catenata*—both common species—and the rare *Chirida scalaris*, the big Elaterid *Alaus putridus*, while two uncommon Passalids, *Teniocerus bicanthatus*, were about the only other beetles of any size or colour. Stripping off the bark of an old stump disclosed a family of flat brown Rhynchota, which Mr. Distant kindly identifies as *Acantharadus giganteus*, Banks; their colour and flatness made them particularly hard to distinguish. With them was a pretty little Tenebrionid, metallic purple and green.

The only Odonata obtained here were the two small Agrionids identified by Dr. Laidlaw as *Agriocnemis* sp. and *Aciagrion borneense*, the rather rare *Amphilestes macrocephala* (Agrionid), and a big *Æschnine Gynacantha*, sp.

After three nights at Tabekang, one of which was devoted to revelry and the next to recovery, B. and I moved on up-river in search of better country. We arranged with C. to meet again at another village further up in four days' time.

May 14th.—Our cheerful Malay crew, who had paddled us up from Simunyan, going on gently for hours on end to the accompaniment of topical songs, were replaced by Dayaks, and we distributed ourselves and our baggage over some half-dozen small boats suitable for the shallows of the upper part of the river. Paddling was no use now, and our crew stood up, two in the bow, two in the stern, poleing us along, now and again dragging the boat over some particularly shallow place. We followed the main Sadong river past the village of Krosin, and further up turned into a little stream on our right, which brought us to the village of Retuh. The sunny spots on this stream showed more signs of insect life, the beautiful brown *Papilio payeni* being one of the first to attract attention; this is a great rarity in Sarawak. Dragonflies appeared in great abundance, the beautiful green *Neurobasis chinensis*, the small Calopterygids *Euphaea tricolor* and *E. inæquipa* all adding beauty to the scene. On the sand we found the little Cicindelid *C. discreta*, and on the bushes above another little Cicindelid (*C. filigera*) was common.

Like most native villages (other than Malay) in Sarawak the inhabitants build one or two long houses, which are divided down the middle by a partition shutting off the living-rooms on one side and a long common verandah on the other. The living-room side is divided into small compartments by partitions at right-angles to the long central wall; each compartment is the home of one family; the number of families thus living in one row varies from three or four to ninety. In the Land-Dayak villages ten to twenty is the average number. A raised flap in the roof gives light and air. The whole house is raised on stilts some 10 ft. from the ground, wood, of course, being the only material used, stone houses being absolutely unknown. One of the distinguishing features of the Land-Dayak villages is the head-house, or *pancha*, as they call it. This is more like an overgrown Pigeon-cote than anything else—a large room, 30 ft. square, raised on wooden posts some 20 ft. off the ground, and protected by a high conical roof. In this

place the councils of the village are held, heads are preserved hanging from the roof, women are usually forbidden to enter, and here strangers are entertained. At Retuh our baggage was taken up to a very rickety head-house, whose supporting posts inclined delicately towards the river. We magnanimously gave this up to our followers and baggage, preferring for ourselves a little hut a few feet off the ground by the river-bank. Here we stayed quite comfortably for three days.

At the back of our hut rose a sharp limestone hill some 800 ft., up which we struggled painfully and to no purpose. Half-way up, however, we found a small clearing which produced some good insects—a Buprestid (*Epidelus wallacei*), which is covered with bright yellow powder when fresh; the big Longicorn (Lamiid) *Anhammus daleni*, with antennæ 5 in. long; six species of *Glenea*; the little green Cetoniid *Glycyphana pygmæa*, and the more common species *Macronata saturalis*. The extraordinary little black ant-like Longicorn (Cerambycid) *Clytellus westwoodi* was obtained here on the 15th, and the next day the collectors brought in the little black Anthicid *Formicomus corvinus*, which is wonderfully like this Longicorn, and the two together excellent mimics of a small black ant. Another small Cerambycid obtained belonging to this group was the little black Clerid mimic *Halme cleriformis*. In the next group we also secured a small species, *Cleomenes dihammaphoroides*.

One of the most interesting beetles obtained here was the big Cassid *Aspidomorpha dorsata*, collected in Borneo for the first time two years before by Mr. J. M. Bryan. Another smaller species, *Metriona obtiva*, was also brought in.

The collector secured a Bat in his butterfly net; it seems to be *Vesperugo tylopus*, a common Sarawak species. The only birds shot here were the Flycatcher (*Philentoma pyrrhopterum*) and the Green Barbet (*Chotorhea mystacophanes*), a common low-country bird in Sarawak.

Three snakes were also obtained, the rather scarce *Coluber tæniurus*, *Simotes purpurascens*, and the very common *Dryophis prasinus*. Like the Dusuns in North Borneo, these Dayaks seemed adepts at Frog-hunting; we saw the boys roasting them over a fire. One victim was identified as *Rana glandulosa*.

The small boys of the village were temporarily attached

to the collecting department, and good work they did. One day we wandered up the stream for an hour or two, chiefly after dragonflies and beetles. Some small fish were disturbed as we paddled along, enjoying the cold clear water seldom above our knees, and hoping they might be of use I offered our small friends a cent for every fish they caught. With the aid of a small stick 18 in. long, and a small loop of fibre at the end, they proceeded to stalk these fish, and succeeded in catching seven or eight in about half-an-hour! The fish appear to be a species of *Crossochilus vittatus*, Blgr. They also secured some prawns (*Atya moluccensis*, De Haan). The big Gasteropod *Ampullaria ampullacea* was found here; it is common all over Sarawak. A small bivalve (*Corbicula moussonii*) was plentiful in the river; it seems to be a local species.

At one spot on the bank we came across some little Vespids flying up and down in the sun; they appear to be *Ischnogaster ornatifrons*.

The Rhynchota were not of much interest, except perhaps a black Cercopid *Ectemnonotum nitidicolle*, a little yellow-spotted species named by Mr. Distant as *Lora inclyta*, Walk., a rather rare Pentatomid, *Hypencha ophthalmica*, Stål, and the Reduviid *Sminthocoris singularis*.

As is usual in such localities, dragonflies were the most attractive insects, and many good species were secured.

Among the *Agrionidæ* obtained was an example of *Amphilestes macrocephala*, which appears to be always rather rare, and only found some way inland. The others obtained here have been identified by Dr. F. F. Laidlaw as follows:—*Disparoneura verticalis*, *Aciagrion crinorubellum*, and *Pseudagrion* sp. n.?

Collecting in the stream at this place produced several lovely Calopterygids—the beautiful green *Neurobasis chinensis* and the common *Vestalis amœna*, which also frequents the jungle away from streams; the black-winged *Dysphæa dimidiata* was noted as scarce; only two specimens of *Euphæa inæquipa*, which I have taken on similar mountain streams in different places in Sarawak. Another pretty *Euphæa* taken was *E. tricolor*, a beautiful insect with greenish-blue patch on wings flashing brightly in the sun.

The other Calopterygids Dr. Laidlaw kindly identifies as:—

Rhinocypha biseriata, which was hard to catch, as it kept so close to the water, and *Micromerus* (? new). The commonest was a beautiful semi-metallic species, *Ictinus melanops*.

A pond of muddy water near the Dayak village was gay with many common Libellulines, of which *Orthetrum sabina* and *O. testaceum* were most in evidence. The pretty *Raphisma inermis*, with basal portion of wing bright azure blue, was noticed; the lilac-pink *Trithemis aurora*, a local species in Sarawak; *Tyriobapta torrida*, *Cratilla metallica*, *Hydrobasileus extraneus* (or *croceus* ?), always scarce, and the little *Nannophya pygmaea* all added to the gaiety of the scene. Two more Dr. Laidlaw has not yet identified for me.

The Dayak boys of the village were responsible for five males (?) of the big Corduline *Epopthalmia australis*, caught (I think) flying up and down the Retuh stream.

They also assisted to catch another showy dragonfly which raced up and down the stream. This was a fine Gomphine, *Heterogomphus*, sp., new to Borneo, allied to *H. sumatranus*, with bright brown-red body, contrasting sharply with bright green thorax, eyes and face, both colours, alas! fading soon after death.

The only other species collected here Dr. Laidlaw identifies as *Ictinus melanops*.

One evening we were invited by the Orang Kaya, or chief of the village, to the usual entertainment of dance and music. This took place in the long common room of one of the long houses; a broad raised bench had been prepared for B. and myself against the outer wall, some gay cloth stretched on the roof above our heads, and the seat well covered with neat home-made mats. In front were three large brass stands heaped up with rice and a few eggs on top. Besides these were several bamboo lengths containing cooked rice. Behind, and facing us, sat the two chiefs of the house, the Orang Kaya and Pengara, and behind them, and on each side, were ranged a large gathering of some hundred natives, men, women and children, a couple of shaky lamps shedding an uncertain light over the scene.

The first item on the programme was a lengthy overture by the brass band, which consisted of some dozen gongs, beaten slowly and in some tune by as many men and boys. After this

the village priest or doctor blessed the food, invoking the help of the gods for general prosperity to the village and to us their guests. The cooked rice was then eaten, each taking a bite off the peeled bamboo, and wishing luck to the giver and to the village generally. Chinese arrack was passed round, tongues loosened, the gongs were turned on again, and then three over-dressed males stepped in before us, shook hands, and proceeded to dance. This was a slow and stately performance, which rather lost its impressiveness from the curious costume of the dancers. This consisted of a cloth wound round the head, a coat ornamented with three belts of silver coins, two worn across the shoulders and one round the waist; below this a skirt which stuck out some four or five inches on a bamboo crinoline; on their ankles a string of small bells. With feet close together, arms extended, hands and body gently curving this way, now that, slowly these three figures gyrated before us. On conclusion they shook hands again, and disappeared among the audience.

It was now the turn of the ladies. The four prettiest had paid us a preliminary call in our hut on the river bank. Their dress is soon described: a coil of brass wire on each fore-arm, more on each leg from the knee to the ankle; several thin rings of red and black rotan round the waist, and a belt of silver coins holding up a short skirt of dark blue cloth, which reached the knee; hair done up in a knot on the back of the head, and—of all horrors—their faces covered with powder! This was quite a new fashion, which I thought should be nipped in the bud at once, so my handkerchief was produced to remove the obnoxious powder from the dusky cheek of one fair girl, and the others then wiped it off themselves. The chief, who watched this proceeding with some amusement, agreed that they were now greatly improved.

Their dance was very similar to that of the men, but made more graceful by continual half curtsies and by the absence of the absurd crinoline. The only addition to their attire needed for the dance was a thin red scarf worn round the neck, and hanging gracefully over their outstretched arms. After the dance they came and sat by us, now talking, now singing some gentle droning song in Dayak.

We had seen all this at Tabekang, and so were not interested

for long; however, a Fowl got loose from somewhere, and fluttered noisily through the assembly, then a late-comer arrived with a large Python (*P. curtus*, the short tailed species) which he had brought home to eat, provided I had no use for it. Then we had a new "turn," provided by our young friends the boy collectors. They were the jolliest little kids imaginable,

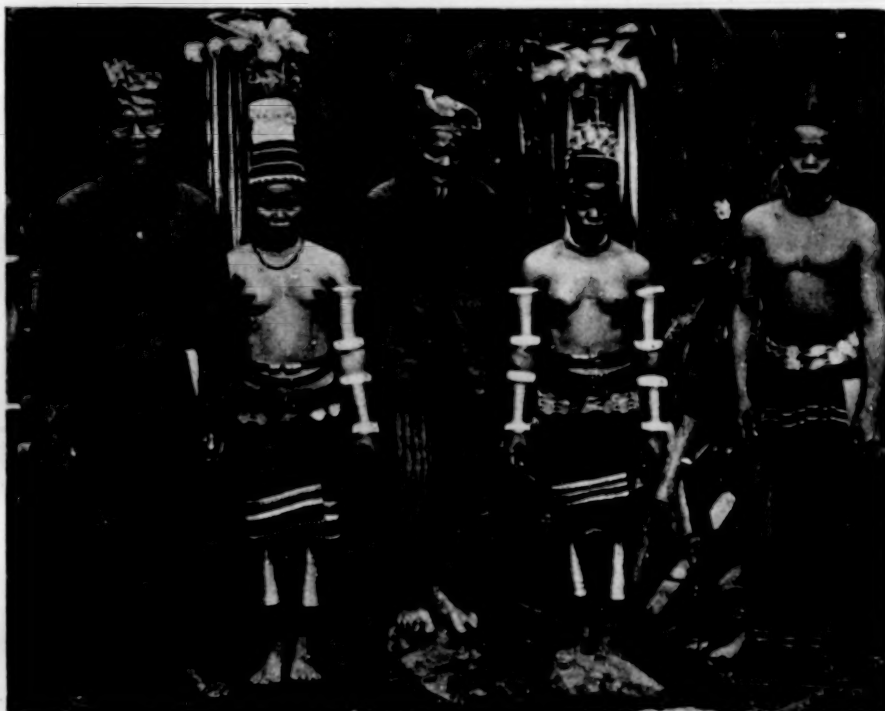


LAND-DAYAKS OF SADONG DISTRICT, SARAWAK. Photo by H. W. Smith.

happy and bright as the day; we got them to give us the curious concert described by Wallace. This consisted of a variety of clapping noises, produced by the boys clapping hands and body together in time, while two with their left hands under their armpits produced "a deep trumpet note"—to quote Wallace, who continues thus: "As they all kept time very well, the effect was by no means unpleasing."

We left them about 11 p.m., but the more energetic spirits kept it up till daylight.

May 17th.—Left Retuh in the morning, a small flotilla of dug-outs taking us down the Retuh stream and then up the main Sadong river for some two hours to the village of Temah. Here we stopped for a meal and to change the crew, the custom being for the traveller to be passed on from village to village. The Pengara, or sub-chief of this village, was an old man getting on for eighty; he told us he was a young man at the



LAND-DAYAKS OF SADONG DISTRICT, SARAWAK. Photo by H. W. Smith.

time of the Chinese insurrection, which took place in Sarawak in 1857. He, if anyone, should have remembered Wallace, but his memory failed him. We left a little after mid-day and entered the Suhuh stream, a branch of the Sadong emerging on the right bank just opposite the village of Temah. Into this stream, quite close to the mouth, runs another little stream called the Borotoi, where the Dayak village was in Wallace's day. Now there is no habitation there.

From here Wallace continued his boat journey up the main Sadong river (or Kayan river as it is known by the Dayaks in

this part) to the village of Budut ("Budu" in the 'Malay Archipelago'). We preferred to make a detour to the south by following up the Sutu stream to the village of Tebedu, and thence to its source in Mt. Merinjak, which was reported to be a large climbable mountain covered with virgin jungle.

We reached Tebedu that evening, and endured the dance performance once more before turning in. Next day we set out for Mt. Merinjak, intending to choose a suitable spot for a camp before moving there next day. The Tebedu Dayaks said we should get there in half an hour. Two hours' hot trudge through shadeless secondary growth brought us to Temong, a large village where welcome coconuts fortified us for the remainder of that "half hour" to the mountain. A good hour's walk brought us to the foot, and as the Temong Dayaks told us there was good water some way up the hill, we took their word for it and started on the three hours' return journey. The Resident turned up shortly after our arrival there, having taken eight hours to come up from Tabekang in a boat. His arrival served as an excuse for another dance in the evening.

May 19th.—We all set out for Temong in the morning, followed by a long train of Dayaks carrying our baggage. At Temong they tried hard to persuade us to stop the night, but B. and I were determined to waste no more time. This was our twelfth day out from Kuching, and beyond the three days at Retuh we had done no serious collecting. After a time new bearers were produced, and we set out for Mt. Merinjak, having said good-bye to C., who had to return to Tebedu and thence down-river to his headquarters at Sadong.

The first hour's walk led through the usual secondary growth as far as the foot of the mountain, and then a steep climb up brought us to the welcome shade of fine big jungle. After an up-and-down walk we camped by the side of a small stream 620 ft. above the sea-level. The Dayaks built us a little shelter, roofed with our two oiled canvas sheets, and then returned to Temong.

We stayed there for eleven days, returning to Temong on May 30th.

(To be continued.)

SOME MISCELLANEOUS NOTES FROM GREAT YARMOUTH (1913-14).

BY ARTHUR H. PATTERSON.

My notes published in this Journal in October, 1913, ended somewhat abruptly in early September. Those in the present number cover a period of some twelve months, and relate in a great measure to observations made in the neighbourhood of St. Olaves, a church-less little village in North Suffolk, on the River Waveney, some four or five miles beyond Breydon water. My week-ends, nowadays, are usually spent in the marshlands in the vicinity of my houseboat ('Moorhen II.'). Breydon still retains some charms for me, although the gradual but ceaseless growing-up of the mudflats and the elimination of many smaller and once punt-navigable "drains" make negotiation almost impossible, except on the higher tides, and circumscribe one's movements very considerably. We have luxuriant acres of *Zostera*, where two or three decades since the mud was bare and oozy, and full of the low forms of life on which small waders chiefly subsist. This *Zostera* holds the silt and flotsam which help to raise the flats; then comes the jointed glasswort (*Salicornia herbacea*), and finally the harsh semi-marine marsh grasses, which now give the historic "Lumps" a rond-like appearance. I cannot but feel a sort of 'Last of the Mohicans' pessimism when alone, lying in my punt at the "Lumps," watching the great hordes of Gulls, the little flocks of Dunlins and their chums the Ringed Plovers, prowling about in search of food, with not another fellow-creature in sight; and calling to mind my youth, when at one time a dozen Eel-catchers might be seen at work over the flats and at the "Fleet" with "pick" or "bab," and as many punt-gunners gliding around in search of Duck and rarer birds, with here and there a trio of smelters hauling in their prey, and a crew of mulletters, or "butters," seeking Flounders or the cunning Grey Mullet. One can go

thither many days in the finer months and, but for the bird-watcher in his hut, in the midst of this waste of mud and waters be alone with the birds. The "close" season, the highly-drained marshes, and the altered flats tempt no new generation of Breydoners; and but two or three, feeble and aged, now survive the sturdy fellows whom, as a lad, I knew so well.*

In the autumn of 1913 a well-known Lowestoft ornithologist sent me the carcasses of two or three Pallas's Sand-Grouse (*Syrnhaptes paradoxus*) that had been received, in the skin, from a Far East consignment, in cold storage. I was not particularly smitten with the flavour, which was a bad cross between Pigeon and Partridge. From the gizzards I turned out several seeds, mixed with a quantity of small white stones, which I planted, and with very little trouble raised a number of small plants. Mr. W. A. Nicholson, of Norwich, kindly forwarded them to Kew, and shortly wrote: "I sent them . . . and they named one of them, the others were in much too young a state to admit of certainty even as to the genus . . . one may probably be a *Desmodium*, and the other a *Medicago*. The full-grown one with pods is *Glycine ussuriensis*, Regel & Maack."

On October 17th, 1913, I received a small box containing a number of walnuts from Norwich, the sender informing me that they fell from a tree in his garden. "I have had," he wrote, "a great many more like them during the past few days, but never before until this year. The tree is about forty-six or forty-seven years old; I planted it myself from a nut. It did not bear any fruit until twenty years old, but they are very small, more so than usual this year, for some reason."

I suggested Nuthatches had been helping themselves, for this species, according to Stevenson ('Birds of Norfolk'), is common in that part of Norwich [Earlham], but the writer insisted they must have been damaged by Starlings, having seen them on the tree—an inconclusive assumption. The nuts were never found in bark-chinks, but invariably on the ground. The depressed end of the shell had been always attacked, and a marble-sized hole had been pecked. Surely a Starling's longer

* The changes on Breydon during the past fifty years are largely referred to in my 'Nature in Eastern Norfolk' and 'Wild Life on a Norfolk Estuary.'

bill would have been scarcely strong enough to split the shell, and, had it been, the kernel would have been more deeply indented. Mr. J. H. Gurney suggested that as it seemed impossible Starlings could have attacked them, he thought Nuthatches had done so; or, peradventure, Squirrels, which seems to me unlikely. Mr. Gurney also remarked, "I never knew a case of Nuthatches eating walnuts before, although I have watched Rooks eating them."

The first recorded Waxwing (*Ampelis garrulus*) of the latest invasion of that species came into my hands on November 15th from St. Olaves, having been sent to me by a farmer who had observed it bustling about in his trees. Numbers were afterwards seen in the neighbourhood, small tame flocks appearing in back gardens of well-populated localities. Several were brought to market, where one of the best old birds I ever saw was procured for a few pence. It had wax tips to the tail feathers, as well as on the wings, and a ruddy tint was observable well up the feather shafts. A friend writing to me from Sheringham on January 11th, 1914, noticed their partiality for the "haws of the brier roses," and their seemingly very thirsty natures—they were constantly sipping at a fountain in the garden.

Six Waxwings came to the garden of a Gorleston gentleman, where the berries of the privet hedge were eagerly seized by them; so tame and confiding were they that both he and his wife observed the minutest details of their plumage, and graphically described their colours as well as actions.

January 3rd.—A short snap of cold weather early in January accounted for a display of very small birds in the Saturday's market, mostly Blackbirds, a species esteemed delicate eating in East Norfolk. A live freshly-trapped Hawfinch was also on sale. A few Teal, Goldeneyes, and Woodcocks were observed in a game-dealer's shop.

January 24th.—I observed that the Gulls haunting the beach were still terrified at the movements of the locally herded aeroplanes, but later in the year the usual hordes of Greater Black-backs then frequenting Breydon had become somewhat less astonished at their flight, which so much resembles the movements of some great Falcon.

Wrens (*Troglodytes parvulus*) appeared to be most plentifully distributed, late in January, in the well-wooded neighbourhood east of St. Olaves.

January 31st.—Saw a Slavonian Grebe (*Podiceps auritus*) in the market on this date; and a number of Ducks, including Pochards and Wigeon, with plenty of Moorhens and Coots.

Mr. F. C. Cook, of Lowestoft, sent me word that on January 21st an Otter, weighing 12 lb., had been shot at Carlton, near that town. How this large animal still manages to avoid extermination in the Broadland districts can only be accounted for by its marvellous cunning and extreme secretiveness of habit.

February 10th.—*Mus rattus*. Two women in a back street were doubtfully peering into a screw of paper, which a small boy was very complacently yet cautiously holding in his extended hands. On going up to see, I found his parcel contained two Rats that he was about to take to the Town Hall, for the penny apiece reward offered for the animals. The scare of two or three years ago that prompted the suppressive measures still provides a "Rat-bin" at the Sanitary Inspector's office; and any Rat found or taken by any possible means is purchased and thrown in, for ultimate cremation at the destructor. One was a half-grown Black Rat (*Mus rattus*), the other a well-grown example of the Alexandrine variety, *Mus r. alexandrinus*. I immediately secured both by offering a more tempting reward, and popped them into my pocket. The larger example was of a greyish colour, with brownish black hairs freely sprinkled along the back and on the rump; the breast, throat, and under parts being yellowish white; ears large and naked; soles of the feet naked and yellowish. The length of the body was six inches; the tail measuring eight inches.

February 7th.—The Jackdaws had come back to the Parish Church steeple, and by their actions several would seem to have paired. It was odd to see the birds excitedly wheeling round and round the spire, one and another doubling in its flight, dropping with Pigeon-like movement, then suddenly halting and quivering, as if throwing water from its plumage. The birds' presence in the town has become so familiar that no one seems to heed them alighting and chattering upon the chimney-pots.

Same date. Four White-fronted Geese (*Anser albifrons*) had been seen on Breydon, three being killed.

Cats living in the country, as is well known, often develop their hunting instincts to a high degree. In an adjoining village there is a commonplace black-and-white feline, some six years old, and frequently having kittens, which spends much of her time stalking among the lush herbage in the wetter portion of a market garden. I have observed her creeping along at the edge of the small ditches that drain the lower end, eagerly searching for Water Voles, tracking down one now and again with marvellous dexterity; and I have known her to actually plunge bodily into the water to secure her prey. She creeps into hiding close by the gardener's young chickens, or wild ducklings (of which he rears many), and springs therefrom upon the Sparrows lured down by the food provided for the fowls. Puss makes no pretence to injure the downiest chicken, nor even makes eyes at the Canaries nesting in the shed within easy reach, seeming to know the limits of her liberty. Not a day passes but Lizards, Sparrows, Field Voles, or other game is brought into the house and laid before the kittens. Among her victims figure also Goldfinch, Linnet, Frog, Woodcock, Rabbit, Snipe (one of the latter was brought in alive on February 17th), and other creatures. A nest of Great Tits discovered on the top of a beehive was emptied by her, and all the young devoured.

February 26th.—Saw a Redshank, with an upturned bill very like a Godwit's.

Rooks to the number of twenty on this date passed over seawards and disappeared in the distance north-eastward.

The shrimpers on the west side of the river, where the timber-sheds and shipping stores are situated, usually catch the cod-end of their dredges and run them up to the mast-head, taking care to empty the meshes of every Shrimp or small fish, owing to the attentions of the Common Rat (*M. decumanus*), which would otherwise be attracted at night by the phosphorescent glow given off by dead victims; for the rodents are adepts at climbing up and gnawing holes in the net to get at them, thus giving the men unnecessary labour in mending. Rats are often disturbed in the early hours when at their depredations by the irate shrimpers: it is odd to see them scuttling to the quays along the

mooring-ropes. If they slip, they do not fall but cling and scamper along like acrobats, and usually manage to end their performances satisfactorily to themselves. These Rats find much to examine in the marine creatures that fall into the billage ; whilst by day Sparrows and Starlings are occasionally observed picking small crustaceans from the drying nets. I might remark that the shrimpers work by the tides, dropping out to sea on the first of the ebb-tide and returning on the top of the flood.

Pigeon shoots were instituted all over the county in March, the destructiveness of the Wood-Pigeon having called for repressive measures. I was informed that at the "big shoot" organized by Sir Savile Crossley at Somerleyton the guns averaged nine birds apiece ; my informant having been stationed in a likely corner bagged fourteen. Two birds which he sent me were empty, "early shot birds," he said, "that had not had time to breakfast." A third bird's crop contained half a cupful of clover leaves ; it had managed to begin breakfast ! An old gamekeeper friend assured me he once shot, on the Lacon estate at Ormesby, a Pigeon from whose crop he counted two hundred and eighty-two large peas ; another closely packed crop disclosed a solid, hard-compressed ball of clover leaves that filled his two hands, and which, when loosely shaken up, nearly filled a quarter-peck measure.

A strange movement of small birds attracted much attention in the neighbourhood, more particularly in Gorleston. The flight was described to me as taking place in the early morning of March 11th, the birds flying at an elevation of some three hundred feet ; the flock extended over a mile and a half, and was of considerable breadth, sufficient to make an appreciable darkening of the sky in passing. No bird fell out, and the species seemed to remain in doubt. Mr. J. H. Gurney wrote me that he had obtained evidence from Mr. J. Vincent, a Broadland gamekeeper, that many flocks of Starlings flew over in a *westerly* direction at the same time at Horsey. The conclusion Mr. Gurney came to was that the Yarmouth birds were also Starlings. There was nothing abnormal in the wind or weather ; so that the direction of the birds' flight may be also looked upon as something of an enigma.

A Mistle-Thrush, nesting in the heart of the town, day after

day perched itself on a tall tree-top in the busiest street, much interesting passing crowds by its bold cheery song.

April 4th.—During a sail round Breydon in my punt I was much interested in the evolutions of a parcel of sixty Wigeon that wheeled around and manœuvred, evidently for the very fun of it, like so many frolicsome Dunlins. Observed six Hooded Crows still with us; and four as late as the 11th.

When sitting in the cabin of 'Moorhen II.' on April 13th with Miss L. Medland, the bird artist, we were discussing birds, and hoping for the coming of the Swallows. I may say that during the afternoon we had noticed a number of St. Mark's Fly (*Bibio marci*) gyrating around the orchard at the farm hard by, a circumstance that called for my remark, "Look! there's *the* fly; the Swallows won't be far off." And sure enough, as we sat chatting, I observed a couple of Swallows dash past the cabin doors. We rushed out just in time to see a whole concourse steadily flying in, passing westward, undoubtedly just from overseas. We watched the majority disappear beyond the St. Olaves railway bridge; eight fell out, and returning to the farm, immediately commenced, as if with a good appetite, to seize many of the insects that had not yet wearied of dancing in the warmth of the lowering sun.

Early in April a French Partridge, wearily crossing the river from the eastward, fell in, and was fished out by a man who brought it to me alive. It was a very wild bird, and for weeks refused even to tolerate my company, so I let it go again.

Observed a Bearded Tit flying among the dense reeds beside the Waveney River on April 26th, and have reason to believe that this species nested there this season. Nightingales nested in the vicinity of my houseboat, and one fine fellow came nightly in May to the fir clump at the back of the farmhouse, treating us to most delightful solos; one of the farmer's sons, however, complained to me "that the row the bahd kicks up prevents him sleepin'."

From Coltishall I received a post-card dated May 6th stating "the Swifts had arrived this morning; one pair generally turn up a day or two before the others."

During May the *Euonymus* shrubs were terribly devastated by the caterpillars of the Magpie Moth. A quick way to get rid

of these pests is to place a white cloth on the ground and roughly shake the shrubs, when the much-surprised larvæ will fall off, and are then easily despatched. I have fed tame Natterjack Toads with this caterpillar, upon which they eagerly prey, the contortions of the caterpillar being curiously overcome by the reptile using its fore feet as hands. I can never watch the comical twinkle in the Toad's eye as the squirming larva tickles him without being amused.

I observed my first Sand-Martin on May 12th. I did not consider this species quite so locally abundant as in some other years.

During May and June the Nightjars appeared to be somewhat numerous, the bracken-covered uplands above the valley of the Waveney being well suited to their habits. One or more came nightly to "churn" in a tall old elm at the farm, making delightful music between the times of their onslaughts upon the night-loving insects. The V-shaped flight makes the bird look excessively uncanny in the gloaming.

A pair of Kingfishers nested in a red-sandy corner near the 'Moorhen II.' The tunnel seems to have been bored by the birds themselves, for no Coney, Stoat, or Rat would have chosen such an exposed and cliff-like location; and the bore was so small that my arm stuck when half-way up. The floor of the tunnel was filthy black, with strong-smelling moisture, large blow-flies being attracted to it. It was odd to see these insects gyrating around and crawling well into the shadow to sip at this obnoxious matter. The young birds kept up a queer, scissor-wheel kind of churning noise, which stopped at the least unfamiliar sound from without, even the hum of a venturesome fly causing a break in it. One old bird cunningly remained inside all the time I stood at the entrance, but as soon as I had shifted my position a trifle, out she came; and a short while after her mate came home with a small Roach in his mandibles; with it he passed through the entrance as neatly and as swiftly as a Swallow dashes through a hole in a marsh-mill window-pane.

One might have thought the brightly-plumaged birds had an eye for beauty when choosing this site—a few yellow furze-sprays were dependent from above, with several wild flowers littering the broken soil at the cliff-base, around which flitted a Tortoise-

shell and some small blue butterflies. Big heaps of flowering brambles and furze-bushes flanked the little slope, and some firs brought up the rear.

On May 22nd when travelling by a Great Northern train I passed, near Hemsby, a long line of clover growing inside the rail fencing, from which sprang thousands of small garden white butterflies, their numbers and movements suggesting a snow-storm falling upwards! I heard next day that great numbers of these butterflies had been observed near the sea coast, suggesting an immigration. Whilst observing these I saw a beautiful male Shoveller rise from the corner of a wheatfield. It kept pace for some distance with the train, flying abreast of the next carriage.

May 23rd.—A flock of some twenty Turtle-Doves observed flying from over sea across the town.

"Reed-Sparrows" haunt the reed-bed the other side of my ditch. The male has a curious habit of perching on an out-standing reed, flicking his tail and balancing himself simultaneously in a half-dancing manner, opening and shutting his tail-feathers with a quick fan-like movement.

For the past six or seven years in some trees overlooking the market place in the centre of the town a flourishing colony of Rooks has existed. This spring nearly a score of nests were built. Two years ago a branch colony was established in a clump of trees at the rear of the parish church, a couple of birds succeeding, after some bullying by the older colony, in rearing a family. Some eight nests were built there this spring.

Redshanks.—On May 20th a pair of Redshanks chose for their nesting place the centre of an adjoining marsh covered with dense reeds, which later yields a very large crop of litter. The birds for some time had been very much in evidence, the male bird being extremely vociferous and constantly pirouetting around. He has been much addicted to perching on a rude bench beside the path on the other side of the marsh, clamouring frequently. He flew around often in an erratic manner, occasionally stopping in his flight for a second or two and quivering vigorously, at the same time piping querulously. A Carrion-Crow daily scouring the neighbourhood, I have reason to believe, discovered the unhatched eggs, which a prowling juvenile egg-collector had failed, after much searching, to do;

and a second batch must have been laid, as a couple of young birds (I observed no more) flew much later than ordinarily. I have noticed this species both on the Bure (Norfolk) and Waveney (Suffolk) marshes for nearly forty years, but do not remember observing young ones on the wing so early as April 25th. It is a weakness of youth to jump to conclusions, although an objectionable practice; I think Mr. Chasen has made a mistake in the species, and rather ambiguously refers to his record as "premature." I am never surprised at not seeing the bulk of our local Redshanks before March 20th; I noticed my earliest arrivals on March 7th this year (1914). They do not nest directly they come. A few odd birds appear to remain in this country all the winter, moving about locally when compelled by the exigencies of the weather. I have observed dead birds on the late Mr. Durrant's game stall in December, January, and February. June 26th is the almost stereotyped date for their deserting the marshes (those of the Waveney, in particular) and resorting to the vicinity of Breydon. The late Mr. W. S. Everett, a noted Suffolk sportsman of the old school, always insisted that "on this date they left the Oulton Marshes for Breydon."

When taking a walk by the side of the Haddiscoe Canal I observed that the *nemoralis* Snails haunted the bottoms of the dank grasses and rushes on the slopes of the bank. Many broken shells lay around, and I notice that in very dry weather the Thrushes and Blackbirds constantly flit across the marsh, more especially towards "mist-rising" at eventide, when molluscs come out to feed, fetching and carrying these Snails home to their youngsters.

Carrion-Crows.—I am glad that a pair of Carrion-Crows still appear to nest in a moist bottomed wood in a village lane three miles away, where I discovered a nest in 1905. Had I then not been almost as keen-eyed as the sable head of the establishment I had not noticed him, for he simply "slid" off the nest noiselessly and cunningly, and, spiriting round the tree trunk, vanished. On June 1st it was probably the same old fellow who winnowed his way into my neighbourhood and caught my attention by his measured scouting, and day after day went through the self-same tactics,

beating along the edges of the reed-beds beside the river, vol-planing over the marshes, and hunting around the outskirts of the farm and the orchard where many fowls are kept and chickens reared. Any dropped egg is speedily spotted and promptly appropriated. Mr. Meen (my neighbour at the farm) and several others who allege they have suffered through Master Crow tried in vain for weeks to get within gunshot of the bird, but without success. Early each morning his coming was made known to me by the clamour of the Redshanks, which dashed at and around him with the audacity of a Lapwing, a procedure utterly ignored by him. One Moorhen hard by lost the whole of its clutch of eggs; and the farmer pointed out to me the remains of the egg-shells, including the addled ones of a Turkey whence he had drawn out and afterwards devoured the dead chickens. I laid out some shells containing fragments of boiled egg: these he discovered and ate up entirely, but a china egg laid in the middle of the marsh, although he sailed round it once or twice, he did not even stop in his flight to test. Later on I saw the whole family party of six; and I think I am correct in believing I saw more than one on Breydon mudflats in August.

June 3rd.—Saw a White Java Dove still in excellent feather, that had just completed its twenty-sixth year: last year it laid two eggs. I have a stuffed one that had reached its thirtieth year.

During a walk along Breydon "walls" on June 3rd I noticed a Common Sandpiper (was it locally nesting?) and a dozen Ringed Plovers, rather late for a flocking of this species. I was also delighted to observe for some time no fewer than four Spoonbills feeding on the flats at the rear of the Watcher's house-boat. They were very restless and active, following each other, sheep fashion, now walking and spooning, now running down the flat edge into the shallow drains (it was low water), and then suddenly breaking into a flight of a few yards. They were exceedingly conspicuous in their pure white against the sombre tints of the mudflats. I feel sure that their principal quest was Sand Shrimps (*Crangon vulgaris*) and Ditch Prawns (*Palæmonetes varians*), both of which are plentiful in the shallows after the tide has drawn off the muds; occasionally this species repairs

to the marsh ditches where *Gammarus* and probably small Sticklebacks have attractions for them. Off and on, all the summer, two or three Spoonbills were generally to be seen.

At 8.15 p.m. a Swift and a Bat were flying around together.

Sixteen Geese were observed to fly over the town on June 18th. Having seen Bernacle-Geese moving aforetime in the second and third weeks of this month (*vide* 'Zoologist,' 1913, p. 364), I am inclined to place these down to the same species.

Several hundred Rooks passed over, coming from the east, on June 18th, a rather unusual date.

A pair of Blue-Tits nesting in a well-used letter-box; a pair of Coal-Tits nesting in the top of a beehive.

The Water-Voles have a flourishing colony in my ditch at St. Olaves: they are the jolliest of little fellows, and are perfectly reconciled to my society. They tumble out of their holes when the tide falls, both early morning and later in the day, spending the hottest part of the day in their snug retreats burrowed well upwards in the bank. At high water their front doors are a yard below the surface. They come out for scraps and appear to appreciate a nibble at apple parings and tomato skins as a change of diet from succulent grass stems and tender reeds. Everything is passed, Squirrel-fashion, by the fore-paws to the mouth. One day in June a splash at the stern of my boat announced the tumbling in of a young Water-Vole. I looked out and saw the old lady with what I took to be an elder son—half-grown. It may be the farmer's dog Mike had bereaved the old Voles of the others in the family, or a Jack that often frequents the ditch. Mother Vole began to swim, the old male sat on the opposite bank breakfasting on moist sweet grass-stems. The younger followed her, and came up with her in the middle of the ditch, when she dived: he swam back to the spot where he started. The dam popped up again and returned to him, evidently giving instructions as well as orders. The youngster seemed petulant and frisked a bit. Then out she swam again, the young one following, his teeth fast to the fur on the lower part of her back. When in the middle she dived, but the youth did not, but turned back and swam to the mud. Again she decoyed him into the middle of the ditch, when suddenly turning, she seized him by the fur at the back of the

shoulders and deliberately dived with him, not leaving hold of him until both emerged in the shallow, where the old male still sat nibbling the grasses. Evidently it was a necessary lesson.

At tea-time the youngster came forth from the burrow alone, and in foraging discovered a bread-crust I had thrown out on the grass above his burrow. He made a sorry climb up the clayey incline, falling back into the water twice, landing therein seemingly with some show of irritation; on the third fall the crust tumbled in with him.

When passing a marine store warehouse in one of the Yarmouth Rows early in June I heard the clamour of the hunt, and naturally turned in to see the "fun." The hands were vigorously turning over bales of old rope and heaps of bones, whereamong a number of Black Rats were in hiding. Two massive bull terriers were in the thick of the *mêlée* with ivory-studded jaws. The Rats had bred all too freely, and were much at home in the byeways and bridle-paths among the stuff. It was queer to observe odd fugitives that had escaped the dogs clambering along a gaspipe near the ceiling that led to another known hiding place, but these, in every instance, were promptly knocked down with a stick. The hunt accounted for some half-score of old, young, and half-grown rodents, and two or three tattered carcasses were discovered later on in the day; these had been killed by the dogs unobserved. The Rats were typical *Mus rattus*.

July (?).—A great peculiarity attached to the Natterjack (*Bufo calamita*) or "Running" Toad is the fact that thousands may be discovered in one village, whilst scarcely one may be met with in the adjoining one. Early one Sunday morning I visited a village lying south of the town expressly to see if I could obtain a few specimens. The village referred to combines, with its level of wet marsh and luxuriant weeds and rising sandy common land covered with furze, to make just the most favourable habitat of the species. The majority that had been catching the unhappy *Harpalus* and other beetles, "sows" (woodlice), and other small fry that haunt the strawberry beds, were scrambling home to a sandy bank at the edge of my friend's garden, where in the ragged sand and among the half-exposed

roots of the furze, they had made their lines of cave-dwellings. It was odd to see rows of Toads, with heads protruding, philosophising on the previous night's raid; and funnier still to observe the late home-comers toddling from their hunt under the strawberry leaves, with protuberant bellies, bandy legs, and glistening eyes. These reptiles must eat largely, for when captured and placed in a box, they vomit pellets of wingcases and the indigestible parts of the harder beetles. When affrighted, freshly caught examples will eject from their hides an unpleasant, cold liquid. They will very speedily become tame, and make interesting pets.

Owing presumably to the greater number of fir trees grown to-day, the Great Sawfly (*Sirex gigas*) would seem to be on the increase. Several were captured in July. Up till August 24th Wasps had not been nearly so abundant this autumn. Two nests I discovered near my houseboat I promptly destroyed by pouring into their entrances a mixture of paraffin, methylated spirits and naphtha, sending a running fire into the interior by applying a match. I had previously marked down the entrances during the day. But there must be (August 30th) a very formidable colony somewhere in the neighbourhood, for during the past two days' oppressive heat the houseboat has been besieged by Wasps of a very lively and offensive tribe, that buzzed around the doors and over my writing paper until I have had to make and use a small bat in self-defence, knocking them down continuously.

On July 25th when sitting in the police-court making a sketch of a very eccentric individual, a Sexton Beetle (*Necrophorus vespillo*), that had by some mischance found its way into this hall of justice, alighted on my drawing, and was promptly secured by me, to the amusement of the reporters who thought the insect's choice of my company rather appropriate!

One July evening I visited a country friend who was looking, with no great delight, upon a ruined beehive. The colony had either died or become bankrupt, and the dry comb left inside the hive had been ruined by the larvæ of the Wax Moth (*Galleria mellonella*). It was odd to see fat inch-long Caterpillars exploring the empty cells, now creeping along the tent-lined hollows where the midrib had been eaten away, now emerging from one

cell and suddenly descending into the adjoining one with remarkable celerity. A few odd Bees crawled disconsolately among the wrecked comb, as if looting in their own fallen city. The inch-long white cylindrical pupa-cases were exceedingly tough, requiring some force to tear them. The "ripe" larvæ must have overlapped continuously those that had metamorphosed before them, for they lay end across end, like tiles, as regularly as leaves in a laurel wreath. Placing some sections of comb, with the insects in every stage, into a wrapper of brown paper, I observed next day that the larvæ had eaten holes in it. I sent my prize to my keeper-son at the insect house in the Zoological Gardens, where he said it made an interesting exhibit. I think it would be desirable that any entomologist who may come across interesting insect episodes of a like nature should send them to this popular and educational institution.

I may add that my Bee friend assured me this was his only hive that had so suffered; and he thought that it was as well that the Moths had founded up a sickly colony and left the healthy ones to take care of themselves.

My friend the Bee-man afterwards took me to see a bed of peas, and complained to me that the numerous empty torn pods had been emptied by Jays that came in the early morning from an adjoining small wood. Certainly he had cause for complaint, and may have correctly adjudged the culprits. One side only had been pecked into ribbons and the peas extracted. He asserted that the birds were so cunning he could not get a shot at them.

July 28th.—Observed a couple of men mowing grass with a machine on a marsh. Around and behind them flew many scores of Swallows and Martins, greedily snapping up the disturbed insects that had been in hiding during the short cold spell that just then obtained.

On August 16th a young White Wyandotte Cockerel came along my ditch bank with a nearly full-grown Field Vole (*Microtus agrestis*) depending from his mandibles, struggling feebly. Once or twice he banged it on the clayey soil, shaking it vigorously, but was too wise to let it loose for a moment. It was only after a chase and a vigorous thwacking with my felt hat that the fowl dropped the rodent, unfortunately quite at the

entrance of a burrow, down which the terrified animal promptly disappeared. I find it is a usual thing for these powerful young fowls to perambulate the marsh and banks in search of such prey; and not infrequently do they capture and devour variously sized Field Voles.

August 21st.—Went up Breydon on the top of the flood-tide. Everywhere, except the "Lumps" (the highest of the flats), was covered. Among the rough "rond-grass" were flocks of Ringed Plovers and Dunlins. The adult Ringed Plovers in some instances were magnificent birds, and a few Dunlins still retained the black nuptial vest. A number of very tame young Plovers had the "collar" of light grey, and a bare patch of white where it had not yet met. Several Turnstones, old and young, had joined the other waders, as had some half dozen Curlew-Sandpipers; one or two of the latter were on change, a light brick colour still distinguishing them. A number of Redshanks piped here and there, but were not so numerous, the Watcher assured me, as they were at the end of June, "when they came to Breydon by hundreds"—a rather inflated figure, undoubtedly. Several Greenshanks flew around, unhappy till tide-fall, when their favourite creeks ran low. As the tide fell, the Curlews came from their siesta on the marshes, knowing by instinct when the tide had turned. As the flats bared, several young Lesser Terns came to them, and were well fed by their parents with young Herrings (*local*, "Whitebait"). The old birds clicked when returning with a fish to one particular young one, the latter answering with a shrill clattering note. The fish was snatched from the old birds' bill and promptly swallowed. Many Black-headed Gulls flocked to the *Zostera* directly the water drew off, and began their search for small Herrings entangled among the fronds.

On this same date a number of Starlings this sultry afternoon flew around like so many Swallows, about fifty yards above head, capturing insects that appeared to be swarming at that elevation. From the fact that odd winged Ants alighted on my coat, I judged this to be the species so eagerly captured by the birds. It was curious to see how, with stiffened, well-spread flight feathers, the Starlings glided around and to and fro, their

heads occasionally turned to snatch at prey they had missed when flying end-on at it.

Owing to the outbreak of war, and all the fishing vessels running into port, the larger Gulls would seem to have been hard pressed. One day in August the Watcher assured me there must have been from 10,000 to 12,000 Gulls of all sorts on the mudflats, where they must have done great execution among, and accounted for, every Shore-Crab and stranded fish or Shrimp that came within reach of keen eyes and strong mandibles. I have seldom seen groups of more beautiful adult Greater Black-backed Gulls than on recent days. The Lesser Black-backed Gull I have not seen at all this summer, and deem it rarer year by year. For some unaccountable reason "Grey" Gulls in the second year plumage have been markedly absent, although third and fourth year birds in the conspicuous blotched state have been freely sprinkled among the adult birds. Common Gulls have been scarce also.

On the last day of the "close" season (August 31st) I saw a crowd of Gulls, a number of Curlews and other waders, scattered all over the vast area of uncovered flats, the tides being so poor they had no need to collect at the "Lumps." A party of nearly a dozen Lapwings, a comparatively scarce visitor to the mudflats, joined other waders upon the muds rendering themselves conspicuous by their rollicking ways and restless movements, one or another rising continually and tumbling about, showing the white under parts. The marshes are extremely dry; hence their resorting to the mudflats.

Dr. H. Wyllys, of this town, when sailing on Wroxham Broad, observed a Tortoise-like creature upon a grassy margin. He secured it, brought it home, and turned it into his garden. After missing it for some days he discovered it in a pit or pool at the lower end of his garden. I went round to see it, and observed its head sticking up out of a weedy corner. With the aid of a rake and a quick snatch of the hand I secured the agile creature and brought it to land. I identified it as the European Pond Tortoise (*Emys orbicularis*). It was healthy and vigorous, and had undoubtedly been living upon the insects and other creatures in the grass-margined pit, with such Worms

and the like it might find on the waste ground surrounding it. It measured $7\frac{1}{2}$ in. I have since discovered that some peripatetic naturalist had early in the summer travelled from town to town with a barrow-load of Land Tortoises, with a few of the specimens of the Pond Tortoise. Mr. F. C. Cook knows of one that wandered into a relative's back garden and has lived there since, moistening itself in a gutter in the vicinity of a water-tap.

Knots came to Breydon in some numbers on September 1st ; and, thanks to their innocence and tameness, quite a considerable number have been shot by "shoulder-gunners" who haunt Breydon walls or creep around the flats in punts directly a few waders are reported coming in.

September 3rd.—A few immature Sheld-Ducks on Breydon.

Wheatears during the first weeks of September had gathered in some numbers on the outskirts of the town.

September 14th.—Several flocks of Starlings, some of them containing numerous birds, have been lately coming in from the east, flying from east to west from over sea. It has occurred to me that this premature immigration may be due to the disturbing factors of battle, which have probably driven them in terror from their Continental marshes. I make this suggestion for what it is worth. I have on one or two occasions observed Gulls flying in from the North Sea in so wild and erratic a fashion as to suggest that the explosions at sea may have disturbed them ; their coming curiously synchronized with reported sea-fights.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, AUSTRALIA, 1914.

ADDRESS BY PROFESSOR WILLIAM BATESON, M.A., F.R.S., *President*.

(Concluded from p. 357.)

PART II.—SYDNEY.

SUCH a problem is raised in a striking form by the population of modern Greece, and especially of Athens. The racial characteristics of the Athenian of the fifth century B.C. are vividly described by Galton in "Hereditary Genius." The fact that in that period a population, numbering many thousands, should have existed, capable of following the great plays at a first hearing, revelling in subtleties of speech, and thrilling with passionate delight in beautiful things, is physiologically a most singular phenomenon. On the basis of the number of illustrious men produced by that age Galton estimated the average intelligence as at least two of his degrees above our own, differing from us as much as we do from the negro. A few generations later the display was over. The origin of that constellation of human genius which then blazed out is as yet beyond all biological analysis, but I think we are not altogether without suspicion of the sequence of the biological events. If I visit a poultry-breeder who has a fine stock of thoroughbred game fowls breeding true, and ten years later—that is to say, ten fowl-generations later—I go again and find scarcely a recognisable game-fowl on the place, I know exactly what has happened. One or two birds of some other or of no breed must have strayed in and their progeny been left undestroyed. Now in Athens we have many indications that up to the beginning of the fifth century, so long as the phratries and gentes were maintained in their integrity there was rather close endogamy, a condition giving the best chance of producing a homogeneous population. There was no lack of material from which intelligence and artistic power might be derived. Sporadically these qualities existed throughout the ancient Greek world from the dawn of history, and, for example, the vase-painters, the makers of the Tanagra figurines, and the gem-cutters were presumably pursuing family crafts, much as are the actor-families* of England or the professorial families of Germany at the present day. How the intellectual strains should have acquired predominance we cannot tell, but in an inbreeding community homogeneity at least is not surprising. At the end of the sixth century came the "reforms" of Cleisthenes (507 B.C.), which sanctioned foreign marriages and admitted to citizenship a number not

* For tables of these families, see the Supplement to *Who's Who in the Theatre*.

only of resident aliens but also of manumitted slaves. As Aristotle says, Cleisthenes legislated with the deliberate purpose of breaking up the phratries and gentes, in order that the various sections of the population might be mixed up as much as possible, and the old tribal associations abolished. The "reform" was probably a recognition and extension of a process already begun; but is it too much to suppose that we have here the effective beginning of a series of genetic changes which in a few generations so greatly altered the character of the people? Under Pericles the old law was restored (451 B.C.), but losses in the great wars led to further laxity in practice, and though at the end of the fifth century the strict rule was re-enacted that a citizen must be of citizen-birth on both sides, the population by that time may well have become largely mongrelised.

Let me not be construed as arguing that mixture of races is an evil: far from it. A population like our own, indeed, owes much of its strength to the extreme diversity of its components, for they contribute a corresponding abundance of aptitudes. Everything turns on the nature of the ingredients brought in, and I am concerned solely with the observation that these genetic disturbances lead ultimately to great and usually unforeseen changes in the nature of the population.

Some experiments of this kind are going on at the present time, in the United States, for example, on a very large scale. Our grandchildren may live to see the characteristics of the American population entirely altered by the vast invasion of Italian and other South European elements. We may expect that the Eastern States, and especially New England, whose people still exhibit the fine Puritan qualities with their appropriate limitations, absorbing little of the alien elements, will before long be in feelings and aptitudes very notably differentiated from the rest. In Japan, also, with the abolition of the feudal system and the rise of commercialism, a change in population has begun which may be worthy of the attention of naturalists in that country. Till the revolution the Samurai almost always married within their own class, with the result, as I am informed, that the caste had fairly recognisable features. The changes of 1868 and the consequent impoverishment of the Samurai have brought about a beginning of disintegration which may not improbably have perceptible effects.

How many genetic vicissitudes has our own peerage undergone! Into the hard-fighting stock of mediæval and Plantagenet times have successively been crossed the cunning shrewdness of Tudor statesmen and courtiers, the numerous contributions of Charles II. and his concubines, reinforcing peculiar and persistent attributes which popular imagination especially regards as the characteristic of peers, ultimately the heroes of finance and industrialism. Definitely intellectual elements have been sporadically added, with rare exceptions, however, from the ranks of lawyers and politicians. To this aristocracy art, learning, and science have contributed sparse ingredients, but these mostly chosen for celibacy or childlessness. A remarkable body of men, nevertheless; with an average "horse-power,"

as Samuel Butler would have said, far exceeding that of any random sample of the middle-class. If only man could be reproduced by budding, what a simplification it would be! In vegetative reproduction heredity is usually complete. The Washington plum can be divided to produce as many identical individuals as are required. If, say, Washington, the statesman, or preferably King Solomon, could similarly have been propagated, all the nations of the earth could have been supplied with ideal rulers.

Historians commonly ascribe such changes as occurred in Athens, and will almost certainly come to pass in the United States, to conditions of life and especially to political institutions. These agencies, however, do little unless they are such as to change the breed. External changes may indeed give an opportunity to special strains, which then acquire ascendancy. The industrial developments which began at the end of the eighteenth century, for instance, gave a chance to strains till then submerged, and their success involved the decay of most of the old aristocratic families. But the demagogue who would argue from the rise of the one and the fall of the other that the original relative positions were not justifiable altogether mistakes the facts.

Conditions give opportunities but cause no variations. For example, in Athens, to which I just referred, the universality of cultivated discernment could never have come to pass but for the institution of slavery which provided the opportunity, but slavery was in no sense a cause of that development, for many other populations have lived on slaves and remained altogether inconspicuous.

The long-standing controversy as to the relative importance of nature and nurture, to use Galton's "convenient jingle of words," is drawing to an end, and of the overwhelmingly greater significance of nature there is no longer any possibility of doubt. It may be well briefly to recapitulate the arguments on which naturalists rely in coming to this decision both as regards races and individuals. First as regards human individuals, there is the common experience that children of the same parents reared under conditions sensibly identical may develop quite differently, exhibiting in character and aptitudes a segregation just as great as in their colours or hair-forms. Conversely, all the more marked aptitudes have at various times appeared and not rarely reached perfection in circumstances the least favourable for their development. Next, appeal can be made to the universal experience of the breeder, whether of animals or plants, that strain is absolutely essential, that though bad conditions may easily enough spoil a good strain, yet that under the best conditions a bad strain will never give a fine result. It is faith, not evidence, which encourages educationists and economists to hope so greatly in the ameliorating effects of the conditions of life. Let us consider what they can do and what they cannot. By reference to some sentences in a charming though pathetic book, 'What Is, and What Might Be,' by Mr. Edmond Holmes, which will be well known in the Educational Section, I may make the point of view of us naturalists clear. I take Mr. Holmes's pronouncement partly

because he is an enthusiastic believer in the efficacy of nurture as opposed to nature, and also because he illustrates his views by frequent appeals to biological analogies which help us to a common ground. Wheat badly cultivated will give a bad yield, though, as Mr. Holmes truly says, wheat of the same strain in similar soil well cultivated may give a good harvest. But, having witnessed the success of a great natural teacher in helping unpromising peasant children to develop their natural powers, he gives us another botanical parallel. Assuming that the wild bullace is the origin of domesticated plums, he tells us that by cultivation the bullace can no doubt be improved so far as to become a better bullace, but by no means can the bullace be made to bear plums. All this is sound biology; but translating these facts into the human analogy, he declares that the work of the successful teacher shows that with man the facts are otherwise, and that the *average* rustic child, whose normal ideal is "bullace-hood," can become the rare exception, developing to a stage corresponding with that of the plum. But the naturalist knows exactly where the parallel is at fault. For the wheat and the bullace are both breeding approximately true, whereas the human crop, like jute and various cottons, is in a state of polymorphic mixture. The population of many English villages may be compared with the crop which would result from sowing a bushel of kernels gathered mostly from the hedges, with an occasional few from an orchard. If anyone asks how it happens that there are any plum-kernels in the sample at all, he may find the answer perhaps in spontaneous variation, but more probably in the appearance of a long-hidden recessive. For the want of that genetic variation, consisting probably, as I have argued, in loss of inhibiting factors, by which the plum arose from the wild form, neither food, nor education, nor hygiene can in any way atone. Many wild plants are half-starved through competition, and transferred to garden soil they grow much bigger; so good conditions might certainly enable the bullace population to develop beyond the stunted physical and mental stature they commonly attain, but plums they can never be. Modern statesmanship aims rightly at helping those who have got sown as wildings to come into their proper class; but let not anyone suppose such a policy democratic in its ultimate effects, for no course of action can be more effective in strengthening the upper classes whilst weakening the lower.

In all practical schemes for social reform the congenital diversity, the essential polymorphism of all civilised communities must be recognised as a fundamental fact, and reformers should rather direct their efforts to facilitating and rectifying class-distinctions than to any futile attempt to abolish them. The teaching of biology is perfectly clear. We are what we are by virtue of our differentiation. The value of civilization has in all ages been doubted. Since, however, the first variations were not strangled in their birth, we are launched on that course of variability of which civilization is the consequence. We cannot go back to homogeneity again, and differentiated we are likely to continue. For a period measures designed

to create a spurious homogeneity may be applied. Such attempts will, I anticipate, be made when the present unstable social state reaches a climax of instability, which may not be long hence. Their effects can be but evanescent. The instability is due not to inequality, which is inherent and congenital, but rather to the fact that in periods of rapid change like the present, convection-currents are set up such that the elements of the strata get intermixed and the apparent stratification corresponds only roughly with the genetic. In a few generations under uniform conditions these elements settle in their true levels once more.

In such equilibrium is content most surely to be expected. To the naturalist the broad lines of solution of the problems of social discontent are evident. They lie neither in vain dreams of a mystical and disintegrating equality, nor in the promotion of that malignant individualism which in older civilizations has threatened mortification of the humbler organs, but rather in a physiological co-ordination of the constituent parts of the social organism. The rewards of commerce are grossly out of proportion to those attainable by intellect or industry. Even regarded as compensation for a dull life, they far exceed the value of the services rendered to the community. Such disparity is an incident of the abnormally rapid growth of population and is quite indefensible as a permanent social condition. Nevertheless capital, distinguished as a provision for offspring, is a eugenic institution; and unless human instinct undergoes some profound and improbable variation, abolition of capital means the abolition of effort; but as in the body the power of independent growth of the parts is limited and subordinated to the whole, similarly in the community we may limit the powers of capital, preserving so much inequality of privilege as corresponds with physiological fact.

At every turn the student of political science is confronted with problems that demand biological knowledge for their solution. Most obviously is this true in regard to education, the criminal law, and all those numerous branches of policy and administration which are directly concerned with the physiological capacities of mankind. Assumptions as to what can be done and what cannot be done to modify individuals and races have continually to be made, and the basis of fact on which such decisions are founded can be drawn only from biological study.

A knowledge of the facts of nature is not yet deemed an essential part of the mental equipment of politicians; but as the priest, who began in other ages as medicine-man, has been obliged to abandon the medical parts of his practice, so will the future behold the school-master, the magistrate, the lawyer, and ultimately the statesman, compelled to share with the naturalist those functions which are concerned with the physiology of race.

NOTES AND QUERIES.

A V E S.

Fieldfare in Captivity.—About a year ago a Fieldfare came into my possession which had been caught by a friend of mine, the bird having evidently flown against the telegraph wires beneath which it was caught, and brought to me for identification. I kept it for some time, and had no difficulty in providing suitable food until well into December. It was very fond of elderberries, of which there was a plentiful supply until well into November, but haws were a complete failure in this district last year, and hips did not appeal to its taste. It would eat currants but was not very fond of them. When the supply of berries was exhausted I was agreeably surprised to find it would eat apples when cut into small pieces. Blackberries it would eat, but was not at all fond of this fruit, as I expected it would be, but still I was finding this fruit up to the first week in December. I used to vary its diet occasionally by finding worms in the garden. It would also eat dates, and I attribute its death to one of my children having given this food, and found that it had swallowed the fruit without rejecting the stones. Its gizzard distended previous to its sudden death to an extraordinary degree. It is often asserted that this species sleeps on the ground, but from the first day of its captivity my bird when retiring for the night manifested a strong desire to perch.—E. P. BUTTERFIELD.

Relative Abundance of the Garden-Warbler and Blackcap.—Referring to the correspondence under this head in the current volume of the 'Zoologist,' from the limited reply to my enquiries, it would be hard to say which of the above species was the more common. Speaking generally, I think it will be found that the Garden-Warbler in the northern portions of England is the commoner species, but in the southern portions, particularly the western side, the Blackcap may be the dominant species; but before any definite statement can be formulated as to the exact status of these two species, more observations from different districts should be sent in. This distri-

bution of birds is a very interesting and complex question. The sudden irruption of the Hawfinch as a breeding species a few years ago into Yorkshire raises a curious question.—E. P. BUTTERFIELD.

A Luminous Owl.—Two years ago, while walking along the flank of an Essex woodland an hour or so after sunset, I had a momentary glimpse of a luminous patch moving in the air at my right hand, some fifty or sixty yards away. Turning my head, I recognized the object as a Barn-Owl; my wife was with me, but by the time I had called her attention to the bird it was invisible. The then recent discussions of "luminous Owls" came to my mind, and before leaving the spot I made one or two observations and simple experiments which served to throw light on this particular instance of the phenomenon, and may perhaps be of more general application. Our path was across a pasture, parallel with the woodland a hundred yards away; and exactly opposite a full moon was just clearing the mists on the horizon. The trees were quite dark, for their almost bare twigs reflected little light. The Barn-Owl in life is extremely sleek and even glossy in plumage, and the under parts of this bird were not only white against the dark trees, but probably acted also as a mirror reflecting the moonlight. When I first detected it, the Owl was overtaking us, so that I saw it sideways, at a wide angle. (From this position the eye is very sensible to such objects as faint stars.) My first impression was that I had seen a moving light, but this was a very momentary feeling, for when I turned my head and looked directly at the bird, it was merely whitish, with little suggestion of luminosity. In a few yards it came opposite a more distant and therefore greyer background, and was not nearly so striking; and a second later the Owl was against the sky—too inconspicuous for my wife to pick up, but visible to me for some further time. The experiments were made by means of handkerchiefs and white paper against various backgrounds, and were repeated on a subsequent occasion. I can sum up by saying that I saw a Barn-Owl luminous against a dark background, decidedly *not* luminous while still visible against the paler distant trees, and invisible against the sky. Here one could hardly entertain any idea of phosphorescence or other similar source of light; but had the circumstances provided an unbroken and very dark background, with appropriate conditions of moonlight, there would have been less confidence in dismissing the theory of the bird being actually the source and the carrier of the light. The Barn-Owl often strikes me as being exceedingly white when it is on the wing in the

early evening or in moonlight; and the moon herself, we may remind ourselves, is light-reflecting and not phosphorescent. So far I have not read of "luminosity" in any other species of Owl, and my theory would break down should one of the brown-plumaged birds prove to be "phosphorescent."—F. J. STUBBS.

Notes on Nest-Boxes.—Referring to my note (*ante*, p. 276), I had a look at some of the boxes to-day (October 6th), and found one occupied by three flourishing young Stock-Doves, perhaps two-thirds grown. Whether the eggs were all laid by one bird, of course one cannot say. Another box contained four Bats; I think they were all Pipistrelles, but did not take them out.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Evolution at the recent Meeting of the British Association (Australia, 1914).—Of course, natural selection plays its part, as it must in all cases, even in the inorganic world, and I believe that in many cases—as, for example, in protective resemblance and mimicry—that part has been an extremely important one. But much more important than natural selection appears to me what Baldwin* has termed "Functional Selection," selection by the organism itself, out of a number of possible reactions, of just those that are required to meet any emergency. As Baldwin puts it, "It is the organism which secures from all its overproduced movements those which are adaptive and beneficial." Natural selection is here replaced by intelligent selection, for I think we must agree with Jennings† that we cannot make a distinction between the higher and the lower organisms in this respect, and that all purposive reactions, or adjustments, are essentially intelligent.

Surely that much-abused philosopher, Lamarck, was not far from the truth when he said, "The production of a new organ in an animal body results from a new requirement which continues to make itself felt, and from a new movement which this requirement begets and maintains."‡ Is not this merely another way of saying that the individual makes adaptive responses to environmental stimuli? Where so many people fall foul of Lamarck is with regard to his belief in the inheritance of acquired characters. But in speaking of acquired characters Lamarck did not refer to such modifications as mutilations; he was obviously talking of the gradual self-adjustment of the organism to its environment.—Prof. ARTHUR DENDY, D.Sc., &c.

* 'Development and Evolution' (New York, 1902), p. 87.

† 'Behaviour of the Lower Organisms' (New York, 1906), pp. 334, 335.

‡ 'Histoire naturelle des Animaux sans Vertèbres,' tom. i., 1815, p. 185.

